**Regional Operational Plan SF.2A.2014.19**

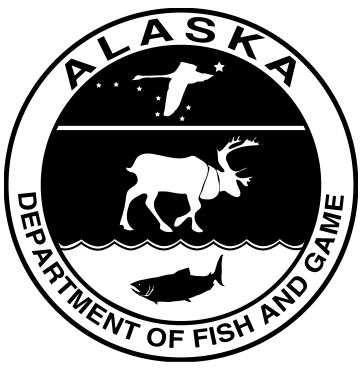
# Operational Plan: Cook Inlet Chinook Salmon Marine Recreational Harvest Assessment

**by**

**Barbi J. Failor**

**March 2015**

**Alaska Department of Fish and Game** **Divisions of Sport Fish and Commercial Fisheries**



## Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

**Weights and measures (metric)**

| | |
|---|---|
| centimeter | cm |
| deciliter | dL |
| gram | g |
| hectare | ha |
| kilogram | kg |
| kilometer | km |
| liter | L |
| meter | m |
| milliliter | mL |
| millimeter | mm |

**Weights and measures (English)**

| | |
|---|---|
| cubic feet per second | $ft^3/s$ |
| foot | ft |
| gallon | gal |
| inch | in |
| mile | mi |
| nautical mile | nmi |
| ounce | oz |
| pound | lb |
| quart | qt |
| yard | yd |

**Time and temperature**

| | |
|---|---|
| day | d |
| degrees Celsius | °C |
| degrees Fahrenheit | °F |
| degrees kelvin | K |
| hour | h |
| minute | min |
| second | s |

**Physics and chemistry**

| | |
|---|---|
| all atomic symbols | |
| alternating current | AC |
| ampere | A |
| calorie | cal |
| direct current | DC |
| hertz | Hz |
| horsepower | hp |
| hydrogen ion activity (negative log of) | pH |
| parts per million | ppm |
| parts per thousand | ppt, ‰ |
| volts | V |
| watts | W |

**General**

| | |
|---|---|
| Alaska Administrative Code | AAC |
| all commonly accepted abbreviations | e.g., Mr., Mrs., AM, PM, etc. |
| all commonly accepted professional titles | e.g., Dr., Ph.D., R.N., etc. |
| at | @ |
| compass directions: | |
| east | E |
| north | N |
| south | S |
| west | W |
| copyright | © |
| corporate suffixes: | |
| Company | Co. |
| Corporation | Corp. |
| Incorporated | Inc. |
| Limited | Ltd. |
| District of Columbia | D.C. |
| et alii (and others) | et al. |
| et cetera (and so forth) | etc. |
| exempli gratia (for example) | e.g. |
| Federal Information Code | FIC |
| id est (that is) | i.e. |
| latitude or longitude | lat or long |
| monetary symbols (U.S.) | $, ¢ |
| months (tables and figures): first three letters | Jan,...,Dec |
| registered trademark | ® |
| trademark | ™ |
| United States (adjective) | U.S. |
| United States of America (noun) | USA |
| U.S.C. | United States Code |
| U.S. state | use two-letter abbreviations (e.g., AK, WA) |

**Mathematics, statistics**

| | |
|---|---|
| *all standard mathematical signs, symbols and abbreviations* | |
| alternate hypothesis | $H_A$ |
| base of natural logarithm | $e$ |
| catch per unit effort | CPUE |
| coefficient of variation | CV |
| common test statistics | (F, t, $\chi^2$, etc.) |
| confidence interval | CI |
| correlation coefficient (multiple) | R |
| correlation coefficient (simple) | r |
| covariance | cov |
| degree (angular ) | ° |
| degrees of freedom | df |
| expected value | $E$ |
| greater than | > |
| greater than or equal to | ≥ |
| harvest per unit effort | HPUE |
| less than | < |
| less than or equal to | ≤ |
| logarithm (natural) | ln |
| logarithm (base 10) | log |
| logarithm (specify base) | $\log_2$, etc. |
| minute (angular) | ' |
| not significant | NS |
| null hypothesis | $H_O$ |
| percent | % |
| probability | P |
| probability of a type I error (rejection of the null hypothesis when true) | α |
| probability of a type II error (acceptance of the null hypothesis when false) | β |
| second (angular) | " |
| standard deviation | SD |
| standard error | SE |
| variance | |
| population | Var |
| sample | var |

*REGIONAL OPERATIONAL PLAN SF.2A.2014.19*

# COOK INLET CHINOOK SALMON MARINE RECREATIONAL HARVEST ASSESSMENT

by

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## SIGNATURE/TITLE PAGE

| | |
|---|---|
| Project Title: | Cook Inlet Chinook marine recreational harvest |
| Project leader(s): | *Barbi J. Failor, Fishery Biologist II* |
| Division, Region and Area | *Sport Fish Division, Region II* |
| Project Nomenclature: | |
| Period Covered | January 2014 – January 2015 |
| Field Dates: | March – September 2014 |
| Plan Type: | Category III |

**Approval**

| Title | Name | Signature | Date |
|---|---|---|---|
| Project leader | Barbi J. Failor | Barbi J. Failor | 01/06/2014 |
| Biometrician | Anton Antonovich | A. Antonovich | 01/06/14 |
| Research Coordinator | Jack Erickson | Jack M | 1/20/2014 |
| Regional Supervisor | James Hasbrouck | James J. Hasbrouck | 2/25/2014 |
| GCL Representative | Andy Barclay | Andrew Barclay | 2/21/14 |

**Chinook Salmon Research Initiative Approval**

| Title | Name | Signature | Date |
|---|---|---|---|
| Fish and Game Coordinator | Ed Jones | Ed Jones | 2.13.15 |
| Fisheries Scientist | Robert Clark | Robert Clark | 2/24/15 |
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# ABSTRACT

This project will collect and analyze age, sex, length, heads of coded-wire-tagged fish, and genetic tissue samples of Chinook salmon harvested in the Cook Inlet marine recreational fishery and information on effort and location of harvest. Genetic samples are needed to estimate the relative stock proportions and number of Chinook salmon harvested in the marine recreational fishery in each temporal and geographic stratum. Division of Sport Fish is responsible for the collection of genetic tissue samples and associated biological and effort data. Tissue samples will be sent to the Division of Commercial Fisheries Gene Conservation Lab, which will be responsible for mixed stock analysis. Survey areas will include the Homer Harbor, Anchor Point tractor launch and marine access area, and the Deep Creek tractor launch and marine access area.

Key words: Chinook salmon, *Oncorhynchus tshawytscha*, Cook Inlet, recreational fishery, genetics.

# PURPOSE

The purpose of this project is to characterize the harvest of Chinook salmon in the Cook Inlet (CI) marine recreational fishery. This project will collect and analyze age, sex, length (ASL), and genetic tissue samples, and collect heads of coded-wire-tagged Chinook salmon harvested in the CI marine recreational fishery. Information on effort and location of harvest will also be collected. Genetic samples are needed to estimate the relative stock proportions and number of Chinook salmon harvested in the marine recreational fishery in each temporal and geographic stratum. The Alaska Department of Fish and Game (ADF&G) Division of Sport Fish (SF) is responsible for the collection of genetic tissue samples, ASL, and effort data. Tissue samples will be sent to the Division of Commercial Fisheries (CF) Gene Conservation Lab (GCL), which will be responsible for mixed stock analysis (MSA).

Cook Inlet Chinook salmon populations support commercial, subsistence, and sport fisheries. Chinook salmon from the Kenai and Susitna rivers (2 of ADF&G's 12 Chinook salmon indicator stocks, used to assess the status of Chinook salmon across the state) migrate through Cook Inlet marine waters frequented by recreational fishermen and marine recreational fisheries information in this area has been identified as an information gap. The need for data from the recreational fishery is underscored by lack of information from the marine recreational sector, measured or perceived declines in abundance, and continued competition among user groups. All agencies and user groups involved in allocation conflicts and development of local area management plans will benefit from accurate data on this fishery.

# OBJECTIVES

## PRIMARY OBJECTIVES

1) Estimate the proportion of Chinook salmon harvest in the CI marine recreational fishery by reporting group for each temporal and geographic stratum for the 2014 season such that the estimated proportions are within 10% of the true values 90% of the time.
2) Estimate the harvest of Chinook salmon in the CI marine recreational fishery by reporting group for each temporal and geographic stratum such that the estimates are within 40% of the true value 90% of the time.

3) Estimate the age composition of the Chinook salmon harvested by the CI marine recreational fishery such that the estimates are within 10% of the true values 95% of the time.

### SECONDARY OBJECTIVES

1) Collect tissue and scale samples from 30% of Chinook salmon harvested in the CI marine recreational fishery.
2) Estimate the sex and length compositions of Chinook salmon harvested in the CI marine recreational fishery.
3) Estimate the proportion of mature Chinook salmon by distance from shore (≤1 nautical mile from shore and >1 nautical mile from shore) harvested by the Central Cook Inlet (CCI) marine recreational fishery.
4) Examine 20% of Chinook salmon harvested in the CI marine recreational fishery for coded wire tags.

Objectives will be met by sampling the harvest of Chinook salmon exiting this fishery at the following 3 major access locations:

1) Deep Creek tractor launch and marine access area
2) Anchor Point tractor launch and marine access area
3) Homer harbor.

## METHODS

The generalized approach is to survey sport anglers and sample their catches at primary access points such as harbors and boat launches and use this data together with the Statewide Harvest Survey (SWHS) to estimate biological parameters. Although the SWHS provides total estimates of the harvest and catch of the corresponding sport fisheries, this mail survey of participating households cannot provide accurate estimates of biological parameters. Therefore, ASL and genetic tissue collection will be sampled on-site. The general study design for this project is to estimate proportions or averages of the specific elements of each fishery and apply these proportions and averages to the corresponding estimate from the SWHS.

### STUDY DESIGN

This project monitors age, size, sex, and maturity characteristics and the genetic stock composition of Chinook salmon landed by sport anglers at the major ports in Cook Inlet. The recreational Chinook salmon harvest will be sampled at the Deep Creek tractor launch and marine access area, Anchor Point tractor launch and marine access area, and Homer harbor access locations. These ports likely account for the majority of Chinook salmon landings in Cook Inlet. At each access location the sampling effort is designed to ensure a consistent proportion of the total harvest of Chinook salmon taken by recreational boat anglers is examined throughout the survey period. Secondarily, the sampling procedures were designed to maximize the number of salmon examined.

The goal will be to sample as many Chinook salmon as possible while distributing sampling effort to allow for as representative a sample of the harvest as is possible. A total of 4 technicians will be assigned to this project. Each technician will be assigned to sample 1 of the 3 ports: 1) Deep Creek tractor launch and marine access area, 2) Anchor Point tractor launch and marine access area, and 3) Homer harbor.

Sampling of the Chinook salmon harvest will be stratified into 2 functional temporal strata associated with each geographic area (Central and Lower Cook Inlet) that coincide with differences in run timing between the majority of Cook Inlet Chinook salmon stocks versus the "late run" stocks from the Kenai River, as outlined in regulation (5 AAC 58.055 "Upper Cook Inlet Salt Water Early-run King Salmon Management Plan," 5 AAC 21.359 "Kenai River Late-Run King Salmon Management Plan," and 5 AAC 58.060 "Lower Cook Inlet Winter Salt Water King Salmon Sport Fishery Management Plan").

Sampling consists of 2 primary components:

1) biological sampling for age, sex, length, maturity, coded-wire-tag (CWT) and genetic tissue samples, and
2) angler interviews to estimate the geographic distribution of effort and other fishery information.

Biological sampling and interviews will be conducted simultaneously. Ideally, collected samples will be proportional to the total harvest over time. However, in some instances, the numbers of fish available to the sampler will not be proportional to the harvest because some landing sites were not sampled, fish were cleaned and carcasses dumped at sea or in the harbor, or fish were kept on the boat and taken home to be cleaned later.

## GEOGRAPHIC AND TEMPORAL STRATIFICATION

Proposed stratification was determined by management criteria. Strata were defined by geography (Central Cook Inlet [CCI] north of Bluff Point lat 59°40′N and Lower Cook Inlet [LCI] south of Bluff Point) and time (1 April–30 June and 1 July–30 September for the CCI section; 1 April–30 September and 1 October–31 March for the LCI section). Recent harvests (2010–2012) were averaged to determine possible harvests for each stratum (Table 1).

Table 1.–Mean SWHS harvest estimates of Chinook salmon in the Cook Inlet marine recreational fishery, 2010–2012.

| Temporal stratum | Central Cook Inlet | Lower Cook Inlet |
|---|---|---|
| 1 April–30 June | 1,636 | – |
| 1 July–30 September | 621 | – |
| 1 April–30 September | – | 3,818 |
| 1 October–31 March | – | 2,213 |

After reviewing recent harvests, various proposed sampling rates were reviewed and a sample rate of 30% was selected as a goal for the 2014 harvest (Table 2).

Table 2.–Target sample sizes based on sampling rates and the 2010–2012 average Cook Inlet marine recreational Chinook salmon harvest estimates.

| | Central Cook Inlet | | | | Lower Cook Inlet | | | |
|---|---|---|---|---|---|---|---|---|
| | Sampling rate | | | | Sampling rate | | | |
| Temporal stratum | 0.1 | 0.2 | 0.25 | 0.3 | 0.1 | 0.2 | 0.25 | 0.3 |
| 1 April–30 June | 164 | 327 | 409 | 491 | – | – | – | – |
| 1 July–30 September | 62 | 124 | 155 | 186 | – | – | – | – |
| 1 April–30 September | – | – | – | – | 382 | 764 | 955 | 1,145 |
| 1 October–31 March | – | – | – | – | 221 | 443 | 553 | 664 |

Ideally, samples would be collected proportional to and representative of the harvest. Practically, given the highly variable nature of the fishery, there will be times when fishing activity is small and all fish are sampled, and there will be times when the samplers are working at maximum capacity and only able to sample a small fraction of the harvest. Postseason subsampling of the collection will allow for improved representation of the harvest. Because all the major access point will be sampled, we expect the subsampling selection rate to be no lower than 50%.

According to sampling theory (Thompson 1987) and under a worst-case scenario (stocks at equal proportions), it will be necessary to sample at least 100 Chinook salmon from each stratum of the fishery harvest to achieve estimates of relative stock proportions that are within 10% of the true values 90% of the time. Based on a 30% harvest sampling rate, a 50% selection rate of subsamples, and 2010–2012 mean SWHS Chinook salmon harvest estimates, we expect each stratum, with one exception, to achieve the 100 sampling minimum (Table 3). Only 93 samples are projected to be collected during the 1 July–30 September CCI stratum. To investigate the accuracy and precision of stock composition estimates that are possible from various potential sample sizes, proof tests will be performed before the field season begins using the up-to-date genetic baseline.

Table 3.–Estimated sample sizes needed in 2014 for mixed stock analysis.

| Temporal stratum | Central Cook Inlet | Lower Cook Inlet |
|---|---|---|
| 1 April–30 June | 245 | – |
| 1 July–30 September | 93 | – |
| 1 April–30 September | – | 572 |
| 1 October–31 March | – | 332 |

Given the precision of the stock composition estimates and the variability of SWHS harvest estimates based on 2010–2012 data, we will be able to estimate the CI Chinook salmon marine recreational harvest in each stratum within 40% of the true values 90% of the time.

The objective criterion (± 0.10 with 95% confidence level) for estimating the age composition of Chinook salmon harvested in the CI marine recreational fishery should be achieved with approximately 170 scale samples. To arrive at this sample size we assumed a 25% scale regeneration rate and the worst-case scenario for multinomial proportions (Thompson 1987).

Because we plan to collect substantially more samples in 2014 (approx. 1200), we are very likely to achieve higher precision for the age composition estimates.

## DESIGN SPECIFICS BY PORT

For all ports, the overall sampling design is described in the Study Design section of the Operational Plan. The general design features for sample selection and data analysis procedures are the same for all locations. The following sections outline details regarding access locations, days of the week, periods of the day, and allocation of technician shifts that are unique to each major port. Additionally, site specific details regarding data collection and recording procedures will be outlined in further detail in the technicians' field procedure manual.

A total of 4 technicians are assigned to the project, working 7.5 hours each scheduled day. The technicians are scheduled such that the Homer and Deep Creek ports (the ports receiving the most fishing effort based on charter logbook information) are covered 7 days per week and Anchor Point is covered 5 days per week. Each of 3 technicians will be assigned to a single port, and the remaining technician will move between the Homer and Deep Creek ports, spending 3 days in Homer and 2 days in Deep Creek each week. All weekends and holidays will be worked, and technicians will get 2 consecutive days off each week (Appendices A1–A4). Derbies scheduled during the winter months (Elks Derby, Homer Chamber of Commerce Winter King Derby) will be sampled by the project biologist.

### Homer

There are numerous exit points in the LCI fishery, including the communities of Homer, Seldovia, Nanwalek, and Port Graham, as well as several hundred private docks along the south side of Kachemak Bay from Bear Cove to Kasitsna Bay (ADF&G 1993: page A-37). Because it would be cost-prohibitive to sample all these exit points, the fishery will be sampled only at the major access point, the city harbor on the Homer Spit.

The Homer Chinook salmon marine recreational fishery will be surveyed from 1 April to 30 September 2014. Sampling will generally start at 1300 hours, but the technician will be free to begin sampling earlier on bad weather days in order to intercept the majority of landings. The harbor and associated facilities cover a large area, making it difficult to distribute sampling effort in a representative manner. When sampling fish, the technician will spread sampling effort between the public fish cleaning stations at Ramps 4 and 6, boats cleaning fish on deck, the boat ramp, the fish cleaning table near the salmon enhancement lagoon, and numerous charter cleaning facilities in an effort to allocate the sample from throughout the day's landings. Ideally, due to the high volume of charter-caught fish, approximately 4 to 5 charter boats would be randomly selected from a list of all known charter vessels for sampling each day. However, this type of sampling is not practical for the following reasons: 1) none of those vessels may have gone out that day, 2) by the time the sampler arrives, some may have already returned and cleaned all or a portion of their load, or 3) all may have returned at once, forcing the sampler to choose a single boat from amongst that list. Instead, the sampler will systematically move through the cleaning locations (cleaning tables, charter offices, and vessels that clean fish on their decks) to obtain samples. Sampling will also be distributed between private and charter-caught fish throughout the shift to spread samples over time and avoid selecting for early or late returning boats.

During the winter Chinook salmon fishery (1 October–31 March), there is no concentration of recreational effort so assigning a port sampler to the area during that time period is unreasonable. There are 2 winter Chinook salmon derbies sponsored by the Homer Elks Club (October) and the Homer Chamber of Commerce (March) that will be sampled by the project biologist and available staff. Additionally, staff will attempt to educate the fleet during the summer fishery and pass out contact information to any who intend to participate in the winter recreational fishery, allowing participants to contact staff when they return to port with Chinook salmon to be sampled. Project staff can meet the returning vessel to gather samples of these fish.

## Deep Creek and Anchor Point Tractor Launch and Marine Access Areas

The Central Cook Inlet (CCI) fishery is primarily a halibut and salmon fishery. The beaches near the mouths of Deep Creek and the Anchor River are the primary access areas and likely account for the majority of Chinook salmon landings from the CCI fishery. The Anchor Point and Deep Creek Chinook salmon marine recreational fisheries will be surveyed from approximately 1 May through 31 August 2014, the time frame during which the tractor launches operate. The possibility of differences in spatial distribution of harvest makes it prudent to distribute sampling effort such that the resulting harvest reported in interviews and biological samples are proportional to harvest at the two sites. Determining the appropriate allocation of sampling effort is problematic for the following reasons: 1) estimates of neither the overall sport harvest (charter and private) nor private harvest are available for Deep Creek and Anchor Point separately, 2) sampling efficiency differs by site, 3) sampling efficiency differs by technician, and 4) the distribution of harvest between the sites is dynamic.

Because only charter harvest data is available for the two sites separately, allocation of sampling effort will be based on relative levels of historical reported charter harvest. It is assumed that sampling efficiency for the charter and private fisheries is similar and that a sample that is representative of charter harvest will represent the private harvest adequately until more information is available. Logbook data from 2010–2012 indicates that on average between the two ports, 69% of charter angler-days, 68% of charter angler-hours, and 69% of charter harvest (in number of fish) were attributed to Deep Creek. Taking this into consideration, the Deep Creek access point will be sampled 7 days per week and the Anchor Point access will be sampled 5 days per week. Available historical data show that the majority of boats exited the fishery during the 6-hour period following high tide (Meyer 1994). In the mid-1990s, many of the boats were launched off the beach or the boat ramps at high tide using personal vehicles. Since then, the boat ramp at Deep Creek has washed out and commercial tractor launching facilities have become well developed at both sites. The majority of both charter boats and private boats now use the commercial tractor facilities and are able to launch at any tide stage. Although the pattern of use at these beaches is likely to have changed since the mid-1990s, there are no data available that describe the complete hourly pattern of boats exiting the fishery.

Based on information from both charter operators and tractor launch operators, and with the intent of intercepting a greater proportion of returning vessels, the planned schedule takes into account 1) seasonal changes in hours of operation of the tractor launches, 2) the approximate 1.5 hour delay between the published tide times and actual slack tide in the center of Cook Inlet, and 3) the pattern of use at Anchor Point.

The work shift at Anchor Point will be from 1100 to 1800 hours, regardless of tide. Sampling activities at Deep Creek will still be structured around the tides, but based on the following rules

that correspond with the hours of operation of the tractor launch: sampling will target high slack tide if it falls within the hours of 0330–1630 before 24 July, or within the hours of 0430–1630 from 24 July to 6 August, or within the hours of 0530–1630 after 6 August. If high slack tide does not meet these criteria, sampling will target low slack tide. If the low slack tide is before 0630 hours, the shift will start at 0900 hours. If the low slack tide is after 1430 hours, the shift will start at 1600 hours, except after 6 August when shifts will begin no later than 1500 hours. For all other tides, if the low slack tide is in the first half of the hour, the shift will start 2 hours after the hour of the tide. If the low slack tide is in the last half of the hour, the shift will start 3 hours after the hour of the tide. All shifts are scheduled preseason and are listed in Appendices A1–A4.

Sampling will be conducted on the beaches and at other areas. The first portion of each shift will be spent on the beach obtaining data from private-caught fish or finding out where anglers will be transporting their fish for cleaning. Anglers usually leave the beach immediately to clean fish at charter facilities or other sites located away from the beach. Harvest sampling at the tractor launch facilities is impractical because it detains boats and disrupts the flow of traffic. Sampling at the boat ramps also requires climbing aboard large boats on trailers, and fish are often in totes or holds and cannot be laid out for sampling. Most of the sampling, therefore, will be at charter cleaning facilities, RV parks, and campgrounds where private-caught fish are cleaned.

## DATA COLLECTION AND REDUCTION

### Biological Sampling

All sampled Chinook salmon will be recorded by statistical area and will be sampled for age, sex, length, maturity, and genetic tissue, and examined for the presence or absence of an adipose fin. For genetic tissue collections a one-half inch piece from the tip of an axillary process fin will be removed from each fish and placed in a 2 ml plastic vial and completely covered with an ethanol (ETOH) solution such that the liquid to tissue ratio by volume is approximately 3:1. Each plastic tube will be sequentially numbered and the vial number will be recorded in the field computer or on data sheets. All plastic vials will be stored at the ADF&G Homer office until the end of the season, when all tubes will be sent to the GCL for analysis. For age, 3 scales will be taken from the left side of the body of each sampled fish at a point on a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin, 2 rows above the lateral line (Welander 1940) and placed on an adhesive-coated card. If the scales in the preferred location cannot be obtained, another set of scales will be taken from as close to the preferred scale area as possible. However, scales will only be taken from the area bounded dorsally by the fourth row of scales above the lateral line, ventrally by the lateral line, and between lines drawn vertically from the posterior insertion of the dorsal fin and the anterior insertion of the anal fin. If no scales are available in the preferred area on the left side of the fish, scales will be collected from the preferred area on the right side of the fish. All data associated with scale collection will be recorded directly onto scale cards containing the sampled scales from each fish. After sampling, scales will be inspected to ensure they are clean and oriented correctly before they dry. An impression is made of the scales on the card using a press under 22,500 pounds per square inch (PSI) and the scale growth patterns are viewed with a 40× power microfiche reader to determine ages. Sex will be determined using external visual cues. Mid eye to tail fork length (METF) will be measured to the nearest 5 millimeters. Technicians will attempt to inspect each harvested Chinook salmon for a missing adipose fin. The number of Chinook salmon inspected

for adipose finclips will be recorded, and heads from Chinook salmon with adipose finclips will be collected and identified with a uniquely numbered cinch strap. Cinch-strapped heads from Chinook salmon will be forwarded to the ADF&G Mark, Age, and Tag Laboratory (MAT) for eventual dissection, tag removal, and decoding. Relative maturity (immature versus prespawning) will be determined for as many Chinook salmon as possible[1].

## Angler Interviews

Technicians will attempt to contact all boat parties as they exit the fishery at each access location. Because of the seasonal nature of recreational salmon and halibut, and subsistence fishing, the initial step in each contact will be to determine whether the vessel was sport fishing and whether anglers targeted or caught any Chinook salmon. Vessel parties that were sport fishing and targeted or caught Chinook salmon while targeting other species will be interviewed, regardless of fishing success. To avoid congestion due to the interview process, the interviews will be brief and conducted as anglers are securing their boats, gear, etc. for exiting the beach, launch, or harbor area.

Once it is established that a vessel is eligible for and consents to an interview, the following information will be recorded for each boat trip:

1) port
2) date and time
3) boat name (if charter) or private vessel designator
4) user group (charter, private)
5) statistical area of harvest
6) location of harvest relative to Bluff Point (north or south) and distance from shore
7) number of private anglers, charter anglers, and guides fishing
8) hours spent targeting Chinook salmon
9) numbers of Chinook salmon kept and released that were greater than or equal to 20 inches in length, and number kept and released that were less than 20 inches in length.

Charter boat skippers, rather than crew or clients, will be interviewed to obtain accurate reporting of statistical areas and harvest location. Whenever possible, technicians will observe and count all harvested Chinook salmon and record that these fish were counted. They will also check to ensure that the fish they are counting represent the entire harvest for that trip (i.e., that no fish have been processed or stored elsewhere on the vessel). Some common situations that preclude counting the actual number of harvested fish include the following: 1) some of the fish were processed and their carcasses were tossed at sea, 2) some of the fish were consumed at sea, 3) some of the fish were already offloaded and carried away, 4) returning boat traffic was extremely heavy and the technician needed to conduct other interviews, or 5) taking the time to count fish would interfere with other boat launching operations and cause congestion at the boat launch or beach. When the recorded number of harvested fish is based on the charter skipper's word, rather than an actual count, this will be noted in the data.

Interview data will be recorded on Allegro CX field computers using DataPlus Professional data capture software. The DataPlus software contains numerous data validation routines that should

[1] All Chinook salmon harvested within each boat party will be sampled for maturity with the anglers' permission. If any angler within a boat party disapproves (i.e., does not want their fish cut open for inspection of gonads) or all fish are not available (i.e., some were processed at sea), then none of the Chinook salmon within that boat party will be sampled for maturity. This procedure is designed to avoid possible biases that might exist (e.g., anglers not wanting large fish "mutilated").

catch most errors at the point of data entry. Port samplers will create a new data file each interview day and back it up to a desktop computer at the end of each shift.

### Data Reduction

Copies of data files will be created and labeled with the date on a daily basis. A backup copy of all data files will be saved on a jump drive at the end of each day. Technicians will return their genetic vial boxes, scale cards, jump drive, and field data to the Homer office weekly and will be responsible for ensuring the recorded data are legible and accurate. Paper forms will be available as a backup in the event the field computer fails. The project biologist will ensure all data are returned, are legible, and are entered correctly.

Scales will be read using a microfiche reader and aged with methods described by Mosher (1969). Age data are keypunched directly into master electronic data files after age is determined by scale reading. Prior to recording ages, known-age reference sets from previous years will be read until a high proportion of assigned ages agree and differences are unbiased and independent of age. A subsample (random 20%) will be read twice to assess within-reader error over time. Scale cards and acetate impressions will be archived at ADF&G in Homer.

Interview data files and Excel workbooks containing biological data will be saved to the hard drive and thumb drive daily and transported to the project leader (B. Failor) weekly for error checking and compilation of sampling summaries. At the end of the season, all interview files will be converted to SAS datasets for analysis and ASCII files for archival. The file structure of the ASCII files will be documented. Excel workbooks will be converted to SAS datasets for analysis and to ASCII files for archiving. All files will be named using conventions established by RTS.

Initial editing of biological data files will include checks of frequency listings for impossible or unlikely data, and will ensure correspondence with collected age structures. After ageing is complete and age data are entered, data files will be checked using a program developed to spot insidious data entry errors and outliers not detectable with frequency listings. The program outputs a list of suspect records that will then be compared to the original data.

Interview files will also be checked with a program that finds insidious data entry errors and outliers not detectable with simple range checks or frequency listings. Hopefully, most of these errors will be identified and corrected at the time of data entry.

Copies of edited biological and interview files will be stored on the Homer LAN server, project leader's computer, and backed up on an external hard drive. Historical archived files and original files can be found in the same locations.

## LABORATORY ANALYSIS

### Assaying Genotypes

DNA extraction and genotyping will generally follow the methods described in detail in Barclay et al. (2012). Briefly, genomic DNA will be extracted from tissue samples using a DNeasy 96 Tissue Kit by QIAGEN (Valencia, CA). Fluidigm 192.24 Dynamic Arrays (http://www.fluidigm.com) will be used to screen 40 SNP markers; this differs from the methods of Barclay et al. (2012) where they used 96.96 Dynamic Arrays. The Dynamic Arrays will be read on a Fluidigm EP1 System or BioMark System after amplification and scored using Fluidigm SNP Genotyping Analysis software. Assays that fail to amplify on the Fluidigm system

will be reanalyzed on the Applied Biosystems platform. The plates will be scanned on an Applied Biosystems Prism 7900HT Sequence Detection System after amplification and scored using Applied Biosystems' Sequence Detection Software version 2.2.

Genotypes produced on both platforms will be imported and archived in the Gene Conservation Laboratory (GCL) Oracle database, LOKI.

### Laboratory Failure Rates and Quality Control

Overall failure rate will be calculated by dividing the number of failed single-locus genotypes by the number of assayed single-locus genotypes. An individual genotype will be considered a failure when a locus for a fish cannot be satisfactorily scored.

Quality control (QC) measures will be used to identify laboratory errors and to determine the reproducibility of genotypes. In this process, 8 of every 96 fish (1 row per 96-well plate) will be reanalyzed for all markers by staff not involved with the original analysis. Laboratory errors found during the QC process will be corrected, and genotypes will be corrected in the database. Inconsistencies not attributable to laboratory error will be recorded, but original genotype scores will be retained in the database.

## DATA ANALYSIS

### Mixed Stock Analysis

Since 2005, a series of ADF&G projects have continued to develop the genetic baseline for Cook Inlet Chinook salmon: West Cook Inlet Chinook Baseline (AKSSF Project Number 44517), Northern Cook Inlet Chinook GSI (AKSSF Project Number 45864), Kenai River Chinook GSI (AKSSF Project Number 45143) and the baseline work for the Susitna/Watana Dam study. These projects have resulted in the collection of 7,104 samples representing 44 populations. Of these fish, 4,992 from 29 populations have been analyzed for 52 markers. From these studies, ADF&G has identified the following reporting groups within Cook Inlet that can be identified with acceptable certainty, based on proof tests (proof test methods are described in Barclay et al. [2010]):

1) West Cook Inlet streams/Yentna River
2) Susitna River
3) Deshka River (Susitna River tributary)
4) Knik Arm and Turnagain Arm streams
5) Kenai River tributaries
6) Kenai River mainstem
7) Kasilof River mainstem
8) Crooked Creek (Kasilof River tributary)
9) South Kenai Peninsula streams
10) other (outside Cook Inlet)

Recognizing the error caused by misassignment among genetically similar reporting groups and potentially small sample sizes, these reporting groups will be combined into 4 broad-scale groups for this analysis as follows:

1. Susitna: Yentna River, Susitna River, and Western Cook Inlet populations
2. Kenai: Kenai River tributaries and mainstem populations

3. OtherCI: Cook Inlet populations from Turnagain Arm, Knik Arm, Kasilof River, and southern coastal Kenai Peninsula.
4. OutsideCI: populations outside of Cook Inlet.

Estimates of Chinook salmon stock composition and harvest by reporting group will be stratified temporally and geographically. Temporal strata will be 1) 1 October–31 March, 2) 1 April–30 June, and 3) 1 July–30 September. Geographic strata will be 1) north of Bluff Point and 2) south of Bluff Point.

The stock composition of the CI marine recreational fishery harvest for each stratum will be estimated using the software package BAYES (Pella and Masuda 2001). BAYES employs a Bayesian algorithm to estimate the most probable contribution of the baseline populations to explain the combination of genotypes in the mixture sample. The final analysis will consist of the results from 5 separate Monte Carlo Markov chains where each chain will begin with different initial values. A random number generator will be used to create the initial values, which will sum to 1 over all reporting groups. The prior distribution in BAYES will be based upon the best available information for each mixture analysis. We believe the best available information for the prior to be the results of MSA of similar mixtures. When we don't have this information from previous years, we will assign an uninformative prior where stock contributions are distributed evenly among all reporting groups. The sum of the prior parameters will equal 1, thus minimizing the overall influence of the prior distribution. The chains will be run until convergence is reached (shrink factor <1.2) for the 5 chains (Pella and Masuda 2001). The first half of each chain will be discarded in order to remove the influence of the initial values; the rest will be used to estimate the posterior distribution of stock composition proportions. The point estimates of stock composition and the variance of these estimates will be calculated from the mean and standard deviation of the posterior distributions.

## Harvest of Chinook Salmon from the Kenai and Susitna Reporting Groups

The number of Chinook salmon originating from rivers in the Kenai reporting group (Kenai-origin; $\hat{H}^{Ke}$) harvested in the Cook Inlet marine recreational fishery between 1 April and 31 March will be estimated as follows:

$$\hat{H}^{Ke} = \sum_{i-1}^{T} \sum_{j=1}^{S} \hat{H}_{i,j} \hat{p}_{i,j}^{Ke} \tag{1}$$

where

| | | |
|---|---|---|
| $\hat{p}_{i,j}^{Ke}$ | = | estimated proportion of CI marine recreational Chinook salmon harvest in time stratum $i$ and geographic stratum $j$ comprising Kenai-origin Chinook salmon and obtained based on Bayesian mixed stock analysis as described in the previous section, |
| $\hat{H}_{i,j}$ | = | CI marine recreational Chinook salmon harvest in time stratum $i$ and area stratum $j$ obtained from SWHS data, |
| $T$ | = | number of time strata (1 October–31 March, 1 April–30 June, and 1 July–30 September), and |
| $S$ | = | number of geographic strata (north and south sections). |

$\text{var}(\hat{H}^{Ke})$ will be estimated using Goodman's formula (Goodman 1960):

$$\text{var}(\hat{H}^{Ke}) = \sum_i \sum_j (\hat{H}_{i,j})^2 \text{ var}(\hat{p}_{i,j}^{Ke}) + (\hat{p}_{i,j}^{Ke})^2 \text{ var}(\hat{H}_{i,j}) - \text{var}(\hat{H}_{i,j}) \text{var}(\hat{p}_{i,j}^{Ke}) \quad (2)$$

where $\text{var}(\hat{p}_{i,j}^{Ke})$ will be available from the Bayesian mixed stock analysis (Pella and Masuda, 2001) and $\text{var}(\hat{H}_{i,j})$ from the SWHS.

The number of Chinook salmon originating from rivers in the Susitna reporting group (Susitna-origin; $\hat{H}^{Su}$) harvested in the CI marine recreational fishery and its variance will be estimated using equations (1) and (2) with the estimated proportion of Susitna-origin Chinook salmon in time stratum *i* and area stratum *j*, $\hat{p}_{i,j}^{Su}$, substituted instead of $\hat{p}_{i,j}^{Ke}$.

## Age, Sex, Length, and Maturity Composition of Chinook Salmon in the Marine Recreational Harvest

The age proportions of Chinook salmon harvested in the CI marine recreational fishery by sampling stratum will be estimated as follows:

$$\hat{p}_{i,j}^{z} = \frac{n_{i,j}^{z}}{n_{i,j}} \quad (3)$$

where $\hat{p}_{i,j}^{z}$ is the estimated proportion of salmon of age category *z* from sampling stratum (*i*, *j*), $n_{i,j}^{z}$ equals the number of fish sampled from sampling stratum (*i*, *j*) that were classified as age category *z*, and $n_{i,j}$ equals the number of Chinook salmon sampled for age determination from sampling stratum (*i*, *j*).

The variance of $\hat{p}_{i,j}^{z}$ will be calculated by

$$\text{var}\left[\hat{p}_{i,j}^{z}\right] = \left(1 - \frac{n_{i,j}}{\hat{H}_{i,j}}\right) \frac{\hat{p}_{i,j}^{z}\left(1 - \hat{p}_{i,j}^{z}\right)}{n_{i,j} - 1} \quad (4)$$

where $\hat{H}_{i,j}$ is the estimated number of Chinook salmon harvested in a sampling stratum (*i, j*).

The estimates of harvest by age categories in each sampling stratum will be calculated by

$$\hat{H}_{i,j}^{z} = \hat{H}_{i,j} \hat{p}_{i,j}^{z} \quad (5)$$

with its variance estimated as follows (Goodman 1960):

$$\text{var}\left[\hat{H}_{i,j}^{z}\right] = H_{i,j}^2 \text{ var}(\hat{p}_{i,j}^{z}) + (\hat{p}_{i,j}^{z})^2 \text{ var}(H_{i,j}) - \text{var}(H_{i,j}) \text{var}(\hat{p}_{i,j}^{z}) \quad (6)$$

The total harvest by age category and its variance will then be estimated by summation:

$$\hat{H}^z = \sum_{i=1}^{T} \sum_{j=1}^{S} \hat{H}_{i.j}^z \tag{7}$$

and

$$\text{var}\left[\hat{H}^z\right] = \sum_{i=1}^{T} \sum_{j=1}^{S} \text{var}\left[\hat{H}_{i,j}^z\right] \tag{8}$$

where $T = 3$ and $S = 2$ are the number of time and geographic strata respectively.

Finally, the total proportion of the ESSN harvest by age category and its variance will be estimated as follows:

$$\hat{p}^z = \frac{\hat{H}^z}{\hat{H}} \tag{9}$$

and

$$\text{var}\left[\hat{p}^z\right] = \frac{1}{\hat{H}^2}\text{var}(\hat{H}^z) + (\hat{H}^z)^2\,\text{var}(\frac{1}{\hat{H}}) - \text{var}(\frac{1}{\hat{H}})\,\text{var}(\hat{H}^z) \tag{10}$$

The delta method will be used to estimate $\text{var}(\frac{1}{\hat{H}})$ as follows:

$$\text{var}\left(\frac{1}{\hat{H}}\right) = \left(\frac{1}{\hat{H}}\right)^4 \text{var}(\hat{H})\,. \tag{11}$$

Length, sex, and maturity composition are estimated using equations 3–11, substituting length, sex, or maturity status for age.

# BUDGET SUMMARY

Proposed FY14 (March–June) and FY15 (full season) costs:

| Line item | Category | FY14 budget ($K) | FY15 budget ($K) |
|---|---|---|---|
| 100 | Personnel | 39.2 | 75.7 |
| 200 | Travel | – | – |
| 300 | Contractual | 11.4 | 45.7 |
| 400 | Commodities | 30.2 | 11.0 |
| 500 | Equipment | – | – |
| Total | | 80.8 | 132.4 |

Funded personnel for FY14:

| PCN | Name | Level | Funded man months |
|---|---|---|---|
| | Vacant | FWT III | 3.0 |
| | Vacant | FWT II | 2.0 |
| | Vacant | FWT II | 2.0 |
| | Vacant | FWT II | 2.0 |
| 114154 | Milburn, Carla | FWT III | 1.0 |
| Total | | | 10.0 |

Funded personnel for FY15:

| PCN | Name | Level | Funded man months |
|---|---|---|---|
| | Vacant | FWT III | 6.0 |
| | Vacant | FWT II | 4.0 |
| | Vacant | FWT II | 4.0 |
| | Vacant | FWT II | 4.0 |
| 114154 | Milburn, Carla | FWT III | 1.5 |
| Total | | | 19.5 |

# SCHEDULE AND DELIVERABLES

Project activities are scheduled as follows:

| Date | Activity |
|---|---|
| March 2014 | Hiring of seasonal staff |
| March–April 2014 | Opportunistically collect winter Chinook salmon samples beginning with the Homer Winter King Salmon Derby |
| Mid-April–late July 2014 | Chinook salmon harvest sampling at all ports |
| Late August 2014 | Data edited and tissue collection transferred to GCL |
| Early October 2014 | Scales aged |
| Mid-October 2014 | ASL composition estimates; tissues analyzed by GCL and MSA results disseminated |
| November 2014 | Harvest estimates completed by temporal, geographic strata and reporting group |
| Early January 2015 | Memo detailing Chinook salmon GLS results through 2014 |
| Spring 2015 | FDS report draft out for review and subsequent publication |

# RESPONSIBILITIES

## PRINCIPAL INVESTIGATOR

Barbi Failor, Project Leader, Fishery Biologist II:

Project leader is responsible for formulating research objectives to meet regional management goals, writes operational plan, oversees budgets, and supervises project technicians. This position will serve as the project biologist and will be responsible for hiring and training personnel and supervision of data collection. The project biologist will be responsible for collating data and transferring tissue samples to Anchorage for GSI analysis and any associated data. This position will also ensure all data is in proper format and archived with RTS at the completion of the field season and will be primary author on any reporting. Additionally, the project biologist submits invoices, manages budget, and prepares budget requests.

## CONSULTING BIOMETRICIAN

Anton Antonovich, Biometrician III:

This position provides guidance on sampling design and data analysis, prepares estimates of harvest of Chinook salmon by reporting group, and assists with preparation of operational plan and report.

## CONSULTING GCL BIOLOGIST

Andy Barclay, Fishery Biologist III:

This position is the Gene Conservation Lab representative, responsible for the analysis of tissue samples for GSI, providing estimates and individual sample assignments to the project biologist and biometrician.

### SAMPLING CREW

Vacant, Fish and Wildlife Technician (4):

Collect biological and fishery data following procedures outlined in the operational plan, field procedure manual, and other instructions, complete data forms in an accurate and timely manner, identify sampling needs and problems, provide fishery information to the project leader for weekly fishing reports, explain the sampling program to the general public, maintain state vehicles and other equipment in good working order, and submit all necessary paperwork in a neat and timely manner. Some technicians will be responsible for enforcing sport fishing regulations, computer data entry, and/or preparation and reading of age structures.

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# APPENDIX A: WORK SCHEDULES

Appendix A1.–Anchor Point work schedule, 2014.

| Date | Day | Duty | Beach hours | Paperwork Due | Comments |
|---|---|---|---|---|---|
| 3 May | Sat | B+I | 1100–1800 | | |
| 4 May | Sun | B+I | 1100–1800 | | |
| 5 May | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 6 May | Tue | Off | | | |
| 7 May | Wed | Off | | | |
| 8 May | Thu | B+I | 1100–1800 | | |
| 9 May | Fri | B+I | 1100–1800 | | |
| 10 May | Sat | B+I | 1100–1800 | | |
| 11 May | Sun | B+I | 1100–1800 | | |
| 12 May | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 13 May | Tue | Off | | | |
| 14 May | Wed | Off | | | |
| 15 May | Thu | B+I | 1100–1800 | Timesheet due, end of shift. | |
| 16 May | Fri | B+I | 1100–1800 | | |
| 17 May | Sat | B+I | 1100–1800 | | |
| 18 May | Sun | B+I | 1100–1800 | | |
| 19 May | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 20 May | Tue | Off | | | |
| 21 May | Wed | Off | | | |
| 22 May | Thu | B+I | 1100–1800 | | |
| 23 May | Fri | B+I | 1100–1800 | | |
| 24 May | Sat | B+I | 1100–1800 | | |
| 25 May | Sun | B+I | 1100–1800 | | |
| 26 May | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 27 May | Tue | Off | | | PAYROLL |
| 28 May | Wed | Off | | | |
| 29 May | Thu | B+I | 1100–1800 | | |
| 30 May | Fri | B+I | 1100–1800 | | |
| 31 May | Sat | B+I | 1100–1800 | Timesheet due, end of shift. | |
| 1 Jun | Sun | B+I | 1100–1800 | | |
| 2 Jun | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 3 Jun | Tue | Off | | | |
| 4 Jun | Wed | Off | | | |
| 5 Jun | Thu | B+I | 1100–1800 | | |
| 6 Jun | Fri | B+I | 1100–1800 | | |
| 7 Jun | Sat | B+I | 1100–1800 | | |
| 8 Jun | Sun | B+I | 1100–1800 | | |
| 9 Jun | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 10 Jun | Tue | Off | | | |
| 11 Jun | Wed | Off | | | PAYROLL |
| 12 Jun | Thu | B+I | 1100–1800 | | |
| 13 Jun | Fri | B+I | 1100–1800 | | |
| 14 Jun | Sat | B+I | 1100–1800 | | |
| 15 Jun | Sun | B+I | 1100–1800 | Timesheet due, end of shift. | |

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Appendix A1.–Page 2 of 3.

| Date | Day | Duty | Beach hours | Paperwork due | Comments |
|---|---|---|---|---|---|
| 16 Jun | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 17 Jun | Tue | Off | | | |
| 18 Jun | Wed | Off | | | |
| 19 Jun | Thu | B+I | 1100–1800 | | |
| 20 Jun | Fri | B+I | 1100–1800 | | |
| 21 Jun | Sat | B+I | 1100–1800 | | |
| 22 Jun | Sun | B+I | 1100–1800 | | |
| 23 Jun | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 24 Jun | Tue | Off | | | |
| 25 Jun | Wed | Off | | | PAYROLL |
| 26 Jun | Thu | B+I | 1100–1800 | | |
| 27 Jun | Fri | B+I | 1100–1800 | | |
| 28 Jun | Sat | B+I | 1100–1800 | | |
| 29 Jun | Sun | B+I | 1100–1800 | | |
| 30 Jun | Mon | B+I | 1100–1800 | WSR, WFR due. Timesheet due, end of shift. | |
| 1 Jul | Tue | Off | | | |
| 2 Jul | Wed | Off | | | |
| 3 Jul | Thu | B+I | 1100–1800 | | |
| 4 Jul | Fri | B+I | 1100–1800 | | Holiday worked |
| 5 Jul | Sat | B+I | 1100–1800 | | |
| 6 Jul | Sun | B+I | 1100–1800 | | |
| 7 Jul | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 8 Jul | Tue | Off | | | |
| 9 Jul | Wed | Off | | | |
| 10 Jul | Thu | B+I | 1100–1800 | | |
| 11 Jul | Fri | B+I | 1100–1800 | | PAYROLL |
| 12 Jul | Sat | B+I | 1100–1800 | | |
| 13 Jul | Sun | B+I | 1100–1800 | | |
| 14 Jul | Mon | B+I | 1100–1800 | WSR, WFR due. Timesheet due, end of shift. | |
| 15 Jul | Tue | Off | | | |
| 16 Jul | Wed | Off | | | |
| 17 Jul | Thu | B+I | 1100–1800 | | |
| 18 Jul | Fri | B+I | 1100–1800 | | |
| 19 Jul | Sat | B+I | 1100–1800 | | |
| 20 Jul | Sun | B+I | 1100–1800 | | |
| 21 Jul | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 22 Jul | Tue | Off | | | |
| 23 Jul | Wed | Off | | | |
| 24 Jul | Thu | B+I | 1100–1800 | | |
| 25 Jul | Fri | B+I | 1100–1800 | | PAYROLL |
| 26 Jul | Sat | B+I | 1100–1800 | | |
| 27 Jul | Sun | B+I | 1100–1800 | | |

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| Date | Day | Duty | Beach hours | Paperwork due | Comments |
|---|---|---|---|---|---|
| 28 Jul | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 29 Jul | Tue | Off | | | |
| 30 Jul | Wed | Off | | | |
| 31 Jul | Thu | B+I | 1100–1800 | Timesheet due, end of shift. | |
| 1 Aug | Fri | B+I | 1100–1800 | | |
| 2 Aug | Sat | B+I | 1100–1800 | | |
| 3 Aug | Sun | B+I | 1100–1800 | | |
| 4 Aug | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 5 Aug | Tue | Off | | | |
| 6 Aug | Wed | Off | | | |
| 7 Aug | Thu | B+I | 1100–1800 | | |
| 8 Aug | Fri | B+I | 1100–1800 | | |
| 9 Aug | Sat | B+I | 1100–1800 | | |
| 10 Aug | Sun | B+I | 1100–1800 | | |
| 11 Aug | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 12 Aug | Tue | Off | | | |
| 13 Aug | Wed | Off | | | PAYROLL |
| 14 Aug | Thu | B+I | 1100–1800 | | |
| 15 Aug | Fri | B+I | 1100–1800 | Timesheet due, end of shift. | |
| 16 Aug | Sat | B+I | 1100–1800 | | |
| 17 Aug | Sun | B+I | 1100–1800 | | |
| 18 Aug | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 19 Aug | Tue | Off | | | |
| 20 Aug | Wed | Off | | | |
| 21 Aug | Thu | B+I | 1100–1800 | | |
| 22 Aug | Fri | B+I | 1100–1800 | | |
| 23 Aug | Sat | B+I | 1100–1800 | | |
| 24 Aug | Sun | B+I | 1100–1800 | | |
| 25 Aug | Mon | B+I | 1100–1800 | WSR, WFR due | |
| 26 Aug | Tue | B+I | 1100–1800 | | |
| 27 Aug | Wed | B+I | 1100–1800 | | PAYROLL |
| 28 Aug | Thu | B+I | 1100–1800 | | |
| 29 Aug | Fri | B+I | 1100–1800 | WSR, WFR due, Timesheet due end of shift | |
| 30 Aug | Sat | Off | | | |
| 31 Aug | Sun | Off | | | |

*Note:* duty code B+I indicates concurrent biological and interview sampling. Paperwork codes include WSR = weekly sampling report and WFR = fishing report. Horizontal lines delineate workweeks. Beach hours for all shifts are 1100–1800 hours.

Appendix A2.–Deep Creek work schedule, 2014.

| Date | Day | Duty | Beach hours | Paperwork due | Comments |
|---|---|---|---|---|---|
| 3 May | Sat | B+I | 900–1500 | | |
| 4 May | Sun | B+I | 900–1500 | | |
| 5 May | Mon | B+I | 1000–1600 | WSR, WFR due | |
| 6 May | Tue | B+I | 1000–1600 | | |
| 7 May | Wed | Off | | | |
| 8 May | Thu | Off | | | |
| 9 May | Fri | B+I | 1400–2000 | | |
| 10 May | Sat | B+I | 1500–2100 | | |
| 11 May | Sun | B+I | 1600–2200 | | |
| 12 May | Mon | B+I | 1600–2200 | WSR, WFR due | |
| 13 May | Tue | B+I | 1600–2200 | Timesheet due, end of shift. | |
| 14 May | Wed | Off | | | |
| 15 May | Thu | Off | | | |
| 16 May | Fri | B+I | 900–1500 | | |
| 17 May | Sat | B+I | 900–1500 | | |
| 18 May | Sun | B+I | 900–1500 | | |
| 19 May | Mon | B+I | 900–1500 | WSR, WFR due | |
| 20 May | Tue | B+I | 1000–1600 | | |
| 21 May | Wed | Off | | | |
| 22 May | Thu | Off | | | |
| 23 May | Fri | B+I | 1400–2000 | | |
| 24 May | Sat | B+I | 1500–2100 | | |
| 25 May | Sun | B+I | 1600–2200 | | |
| 26 May | Mon | B+I | 1600–2200 | WSR, WFR due | |
| 27 May | Tue | B+I | 1600–2200 | | PAYROLL |
| 28 May | Wed | Off | | | |
| 29 May | Thu | Off | | | |
| 30 May | Fri | B+I | 900–1500 | | |
| 31 May | Sat | B+I | 900–1500 | Timesheet due, end of shift. | |
| 1 Jun | Sun | B+I | 900–1500 | | |
| 2 Jun | Mon | B+I | 900–1500 | WSR, WFR due | |
| 3 Jun | Tue | B+I | 900–1500 | | |
| 4 Jun | Wed | Off | | | |
| 5 Jun | Thu | Off | | | |
| 6 Jun | Fri | B+I | 1200–1800 | | |
| 7 Jun | Sat | B+I | 1300–1900 | | |
| 8 Jun | Sun | B+I | 1400–2000 | | |
| 9 Jun | Mon | B+I | 1500–2100 | WSR, WFR due | |
| 10 Jun | Tue | B+I | 1600–2200 | | |
| 11 Jun | Wed | Off | | | PAYROLL |
| 12 Jun | Thu | Off | | | |
| 13 Jun | Fri | B+I | 900–1500 | | |
| 14 Jun | Sat | B+I | 900–1500 | | |
| 15 Jun | Sun | B+I | 900–1500 | Timesheet due, end of shift. | |

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Appendix A2.–Page 2 of 3.

| Date | Day | Duty | Beach hours | Paperwork due | Comments |
|---|---|---|---|---|---|
| 16 Jun | Mon | B+I | 900–1500 | WSR, WFR due | |
| 17 Jun | Tue | B+I | 900–1500 | | |
| 18 Jun | Wed | Off | | | |
| 19 Jun | Thu | Off | | | |
| 20 Jun | Fri | B+I | 1200–1800 | | |
| 21 Jun | Sat | B+I | 1300–1900 | | |
| 22 Jun | Sun | B+I | 1500–2100 | | |
| 23 Jun | Mon | B+I | 1600–2200 | WSR, WFR due | |
| 24 Jun | Tue | B+I | 1600–2200 | | |
| 25 Jun | Wed | Off | | | PAYROLL |
| 26 Jun | Thu | Off | | | |
| 27 Jun | Fri | B+I | 900–1500 | | |
| 28 Jun | Sat | B+I | 900–1500 | | |
| 29 Jun | Sun | B+I | 900–1500 | | |
| 30 Jun | Mon | B+I | 900–1500 | WSR, WFR due. Timesheet due, end of shift. | |
| 1 Jul | Tue | B+I | 900–1500 | | |
| 2 Jul | Wed | Off | | | |
| 3 Jul | Thu | Off | | | |
| 4 Jul | Fri | B+I | 1000–1600 | | Holiday worked |
| 5 Jul | Sat | B+I | 1100–1700 | | |
| 6 Jul | Sun | B+I | 1200–1800 | | |
| 7 Jul | Mon | B+I | 1400–2000 | WSR, WFR due | |
| 8 Jul | Tue | B+I | 1500–2100 | | |
| 9 Jul | Wed | Off | | | |
| 10 Jul | Thu | Off | | | |
| 11 Jul | Fri | B+I | 1600–2200 | | PAYROLL |
| 12 Jul | Sat | B+I | 1600–2200 | | |
| 13 Jul | Sun | B+I | 900–1500 | | |
| 14 Jul | Mon | B+I | 900–1500 | WSR, WFR due | |
| 15 Jul | Tue | B+I | 900–1500 | Timesheet due, end of shift. | |
| 16 Jul | Wed | Off | | | |
| 17 Jul | Thu | Off | | | |
| 18 Jul | Fri | B+I | 1000–1600 | | |
| 19 Jul | Sat | B+I | 1200–1800 | | |
| 20 Jul | Sun | B+I | 1300–1900 | | |
| 21 Jul | Mon | B+I | 1400–2000 | WSR, WFR due | |
| 22 Jul | Tue | B+I | 1600–2200 | | |
| 23 Jul | Wed | Off | | | |
| 24 Jul | Thu | Off | | | |
| 25 Jul | Fri | B+I | 1600–2200 | | PAYROLL |
| 26 Jul | Sat | B+I | 1600–2200 | | |
| 27 Jul | Sun | B+I | 1300–1900 | | |

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| Date | Day | Duty | Beach hours | Paperwork due | Comments |
|---|---|---|---|---|---|
| 28 Jul | Mon | B+I | 900–1500 | WSR, WFR due | |
| 29 Jul | Tue | B+I | 900–1500 | Timesheet due, end of shift. | |
| 30 Jul | Wed | Off | | | |
| 31 Jul | Thu | Off | | | |
| 1 Aug | Fri | B+I | 900–1500 | | |
| 2 Aug | Sat | B+I | 1000–1600 | | |
| 3 Aug | Sun | B+I | 1100–1700 | | |
| 4 Aug | Mon | B+I | 1200–1800 | WSR, WFR due | |
| 5 Aug | Tue | B+I | 1300–1900 | | |
| 6 Aug | Wed | Off | | | |
| 7 Aug | Thu | Off | | | |
| 8 Aug | Fri | B+I | 1500–2100 | | |
| 9 Aug | Sat | B+I | 1500–2100 | | |
| 10 Aug | Sun | B+I | 1500–2100 | | |
| 11 Aug | Mon | B+I | 1300–1900 | WSR, WFR due | |
| 12 Aug | Tue | B+I | 1300–1900 | | |
| 13 Aug | Wed | Off | | | PAYROLL |
| 14 Aug | Thu | Off | | | |
| 15 Aug | Fri | B+I | 900–1500 | Timesheet due, end of shift. | |
| 16 Aug | Sat | B+I | 1000–1600 | | |
| 17 Aug | Sun | B+I | 1100–1700 | | |
| 18 Aug | Mon | B+I | 1200–1800 | WSR, WFR due | |
| 19 Aug | Tue | B+I | 1400–2000 | | |
| 20 Aug | Wed | Off | | | |
| 21 Aug | Thu | Off | | | |
| 22 Aug | Fri | B+I | 1500–2100 | | |
| 23 Aug | Sat | B+I | 1500–2100 | | |
| 24 Aug | Sun | B+I | 1500–2100 | | |
| 25 Aug | Mon | B+I | 1500–2100 | WSR, WFR due | |
| 26 Aug | Tue | B+I | 1300–1900 | | |
| 27 Aug | Wed | B+I | 1300–1900 | | PAYROLL |
| 28 Aug | Thu | B+I | 1400–2000 | | |
| 29 Aug | Fri | B+I | 900–1500 | WSR, WFR due. Timesheet due, end of shift. | |
| 30 Aug | Sat | Off | | | |
| 31 Aug | Sun | Off | | | |

*Note:* duty code B+I indicates concurrent biological and interview sampling. Paperwork codes include WSR = weekly sampling report and WFR = fishing report. Horizontal lines delineate workweeks.

Appendix A3.–Homer Harbor work schedule, 2014.

| Date | Day | Duty | Dock hours | Paperwork due | Comments |
|---|---|---|---|---|---|
| 1 Apr | Tue | Off | | | |
| 2 Apr | Wed | B+I | 1300–2100 | | |
| 3 Apr | Thu | B+I | 1300–2100 | | |
| 4 Apr | Fri | B+I | 1300–2100 | | |
| 5 Apr | Sat | B+I | 1300–2100 | | |
| 6 Apr | Sun | B+I | 1300–2100 | | |
| 7 Apr | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 8 Apr | Tue | Off | | | |
| 9 Apr | Wed | Off | | | |
| 10 Apr | Thu | B+I | 1300–2100 | | |
| 11 Apr | Fri | B+I | 1300–2100 | | |
| 12 Apr | Sat | B+I | 1300–2100 | | |
| 13 Apr | Sun | B+I | 1300–2100 | WSR, WFR due. Timesheet due, end of shift. | |
| 14 Apr | Mon | Off | | | |
| 15 Apr | Tue | Off | | | |
| 16 Apr | Wed | B+I | 1300–2100 | | |
| 17 Apr | Thu | B+I | 1300–2100 | | |
| 18 Apr | Fri | B+I | 1300–2100 | | |
| 19 Apr | Sat | B+I | 1300–2100 | | |
| 20 Apr | Sun | B+I | 1300–2100 | | |
| 21 Apr | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 22 Apr | Tue | B+I | 1300–2100 | | |
| 23 Apr | Wed | Off | | | |
| 24 Apr | Thu | Off | | | |
| 25 Apr | Fri | B+I | 1300–2100 | | PAYROLL |
| 26 Apr | Sat | B+I | 1300–2100 | | |
| 27 Apr | Sun | B+I | 1300–2100 | WSR, WFR due | |
| 28 Apr | Mon | Off | | | |
| 29 Apr | Tue | Off | | | |
| 30 Apr | Wed | B+I | 1300–2100 | Timesheet due, end of shift. | |
| 1 May | Thu | B+I | 1300–2100 | | |
| 2 May | Fri | B+I | 1300–2100 | | |
| 3 May | Sat | B+I | 1300–2100 | | |
| 4 May | Sun | B+I | 1300–2100 | | |
| 5 May | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 6 May | Tue | B+I | 1300–2100 | | |
| 7 May | Wed | B+I | 1300–2100 | | |
| 8 May | Thu | B+I | 1300–2100 | | |
| 9 May | Fri | B+I | 1300–2100 | | |
| 10 May | Sat | Off | | | |
| 11 May | Sun | Off | | | |

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| Date | Day | Duty | Dock hours | Paperwork due | Comments |
|---|---|---|---|---|---|
| 12 May | Mon | B+I | 1300–2100 | WSR, WFR due | PAYROLL |
| 13 May | Tue | B+I | 1300–2100 | | |
| 14 May | Wed | B+I | 1300–2100 | | |
| 15 May | Thu | B+I | 1300–2100 | Timesheet due, end of shift. | |
| 16 May | Fri | B+I | 1300–2100 | | |
| 17 May | Sat | Off | | | |
| 18 May | Sun | Off | | | |
| 19 May | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 20 May | Tue | B+I | 1300–2100 | | |
| 21 May | Wed | B+I | 1300–2100 | | |
| 22 May | Thu | B+I | 1300–2100 | | |
| 23 May | Fri | B+I | 1300–2100 | | |
| 24 May | Sat | Off | | | |
| 25 May | Sun | Off | | | |
| 26 May | Mon | B+I | 1300–2100 | WSR, WFR due | Holiday worked |
| 27 May | Tue | B+I | 1300–2100 | | PAYROLL |
| 28 May | Wed | B+I | 1300–2100 | | |
| 29 May | Thu | B+I | 1300–2100 | | |
| 30 May | Fri | B+I | 1300–2100 | Timesheet due, end of shift. | |
| 31 May | Sat | Off | | | |
| 1 Jun | Sun | Off | | | |
| 2 Jun | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 3 Jun | Tue | B+I | 1300–2100 | | |
| 4 Jun | Wed | B+I | 1300–2100 | | |
| 5 Jun | Thu | B+I | 1300–2100 | | |
| 6 Jun | Fri | B+I | 1300–2100 | | |
| 7 Jun | Sat | Off | | | |
| 8 Jun | Sun | Off | | | |
| 9 Jun | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 10 Jun | Tue | B+I | 1300–2100 | | |
| 11 Jun | Wed | B+I | 1300–2100 | | PAYROLL |
| 12 Jun | Thu | B+I | 1300–2100 | | |
| 13 Jun | Fri | B+I | 1300–2100 | Timesheet due, end of shift. | |
| 14 Jun | Sat | Off | | | |
| 15 Jun | Sun | Off | | | |
| 16 Jun | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 17 Jun | Tue | B+I | 1300–2100 | | |
| 18 Jun | Wed | B+I | 1300–2100 | | |
| 19 Jun | Thu | B+I | 1300–2100 | | |
| 20 Jun | Fri | B+I | 1300–2100 | | |
| 21 Jun | Sat | Off | | | |
| 22 Jun | Sun | Off | | | |

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| Date | Day | Duty | Dock hours | Paperwork due | Comments |
|---|---|---|---|---|---|
| 23 Jun | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 24 Jun | Tue | B+I | 1300–2100 | | |
| 25 Jun | Wed | B+I | 1300–2100 | | PAYROLL |
| 26 Jun | Thu | B+I | 1300–2100 | | |
| 27 Jun | Fri | B+I | 1300–2100 | | |
| 28 Jun | Sat | Off | | | |
| 29 Jun | Sun | Off | | | |
| 30 Jun | Mon | B+I | 1300–2100 | WSR, WFR due. Timesheet due, end of shift. | |
| 1 Jul | Tue | B+I | 1300–2100 | | |
| 2 Jul | Wed | B+I | 1300–2100 | | |
| 3 Jul | Thu | B+I | 1300–2100 | | |
| 4 Jul | Fri | B+I | 1300–2100 | | Holiday worked |
| 5 Jul | Sat | Off | | | |
| 6 Jul | Sun | Off | | | |
| 7 Jul | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 8 Jul | Tue | B+I | 1300–2100 | | |
| 9 Jul | Wed | B+I | 1300–2100 | | |
| 10 Jul | Thu | B+I | 1300–2100 | | |
| 11 Jul | Fri | B+I | 1300–2100 | | PAYROLL |
| 12 Jul | Sat | Off | | | |
| 13 Jul | Sun | Off | | | |
| 14 Jul | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 15 Jul | Tue | B+I | 1300–2100 | Timesheet due, end of shift. | |
| 16 Jul | Wed | B+I | 1300–2100 | | |
| 17 Jul | Thu | B+I | 1300–2100 | | |
| 18 Jul | Fri | B+I | 1300–2100 | | |
| 19 Jul | Sat | Off | | | |
| 20 Jul | Sun | Off | | | |
| 21 Jul | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 22 Jul | Tue | B+I | 1300–2100 | | |
| 23 Jul | Wed | B+I | 1300–2100 | | |
| 24 Jul | Thu | B+I | 1300–2100 | | |
| 25 Jul | Fri | B+I | 1300–2100 | | PAYROLL |
| 26 Jul | Sat | Off | | | |
| 27 Jul | Sun | Off | | | |
| 28 Jul | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 29 Jul | Tue | B+I | 1300–2100 | | |
| 30 Jul | Wed | B+I | 1300–2100 | | |
| 31 Jul | Thu | B+I | 1300–2100 | Timesheet due, end of shift. | |
| 1 Aug | Fri | B+I | 1300–2100 | | |
| 2 Aug | Sat | Off | | | |
| 3 Aug | Sun | Off | | | |

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| Date | Day | Duty | Dock hours | Paperwork due | Comments |
|---|---|---|---|---|---|
| 4 Aug | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 5 Aug | Tue | B+I | 1300–2100 | | |
| 6 Aug | Wed | B+I | 1300–2100 | | |
| 7 Aug | Thu | B+I | 1300–2100 | | |
| 8 Aug | Fri | B+I | 1300–2100 | | |
| 9 Aug | Sat | Off | | | |
| 10 Aug | Sun | Off | | | |
| 11 Aug | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 12 Aug | Tue | B+I | 1300–2100 | | |
| 13 Aug | Wed | B+I | 1300–2100 | | PAYROLL |
| 14 Aug | Thu | B+I | 1300–2100 | | |
| 15 Aug | Fri | B+I | 1300–2100 | Timesheet due, end of shift. | |
| 16 Aug | Sat | Off | | | |
| 17 Aug | Sun | Off | | | |
| 18 Aug | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 19 Aug | Tue | B+I | 1300–2100 | | |
| 20 Aug | Wed | B+I | 1300–2100 | | |
| 21 Aug | Thu | B+I | 1300–2100 | | |
| 22 Aug | Fri | B+I | 1300–2100 | | |
| 23 Aug | Sat | Off | | | |
| 24 Aug | Sun | Off | | | |
| 25 Aug | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 26 Aug | Tue | B+I | 1300–2100 | | |
| 27 Aug | Wed | Off | | | PAYROLL |
| 28 Aug | Thu | Off | | | |
| 29 Aug | Fri | B+I | 1300–2100 | | |
| 30 Aug | Sat | B+I | 1300–2100 | | |
| 31 Aug | Sun | B+I | 1300–2100 | Timesheet due, end of shift. | |
| 1 Sep | Mon | B+I | 1300–2100 | WSR, WFR due | Holiday worked |
| 2 Sep | Tue | B+I | 1300–2100 | | |
| 3 Sep | Wed | Off | | | |
| 4 Sep | Thu | Off | | | |
| 5 Sep | Fri | B+I | 1300–2100 | | |
| 6 Sep | Sat | B+I | 1300–2100 | | |
| 7 Sep | Sun | B+I | 1300–2100 | | |
| 8 Sep | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 9 Sep | Tue | B+I | 1300–2100 | | |
| 10 Sep | Wed | Off | | | |
| 11 Sep | Thu | Off | | | PAYROLL |
| 12 Sep | Fri | B+I | 1300–2100 | | |
| 13 Sep | Sat | B+I | 1300–2100 | | |
| 14 Sep | Sun | B+I | 1300–2100 | | |

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| Date | Day | Duty | Dock hours | Paperwork due | Comments |
|---|---|---|---|---|---|
| 15 Sep | Mon | B+I | 1300–2100 | WSR, WFR due. Timesheet due, end of shift. | |
| 16 Sep | Tue | B+I | 1300–2100 | | |
| 17 Sep | Wed | Off | | | |
| 18 Sep | Thu | Off | | | |
| 19 Sep | Fri | B+I | 1300–2100 | | |
| 20 Sep | Sat | B+I | 1300–2100 | | |
| 21 Sep | Sun | B+I | 1300–2100 | | |
| 22 Sep | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 23 Sep | Tue | B+I | 1300–2100 | | |
| 24 Sep | Wed | Off | | | |
| 25 Sep | Thu | Off | | | PAYROLL |
| 26 Sep | Fri | B+I | 1300–2100 | | |
| 27 Sep | Sat | B+I | 1300–2100 | | |
| 28 Sep | Sun | B+I | 1300–2100 | | |
| 29 Sep | Mon | B+I | 1300–2100 | WSR, WFR due | |
| 30 Sep | Tue | B+I | 1300–2100 | Timesheet due, end of shift. | |

*Note:* duty code B+I indicates concurrent biological and interview sampling. Paperwork codes include WSR = weekly sampling report and WFR = fishing report. Horizontal lines delineate workweeks. Beach hours for all shifts are 1300–2100 hours.

Appendix A4.–Roving Technician work schedule, 2014.

| Date | Day | Duty | Location | Shift | Paperwork Due | Comments |
|---|---|---|---|---|---|---|
| 3 May | Sat | B+I | DC | 900–1500 | | |
| 4 May | Sun | B+I | HOM | 1300–2100 | | |
| 5 May | Mon | Off | | | | |
| 6 May | Tue | Off | | | | |
| 7 May | Wed | B+I | DC | 1200–1800 | | |
| 8 May | Thu | B+I | DC | 1300–1900 | | |
| 9 May | Fri | B+I | HOM | 1300–2100 | | |
| 10 May | Sat | B+I | HOM | 1300–2100 | | |
| 11 May | Sun | B+I | HOM | 1300–2100 | | |
| 12 May | Mon | Off | | | | |
| 13 May | Tue | Off | | | | |
| 14 May | Wed | B+I | DC | 1600–2200 | | |
| 15 May | Thu | B+I | DC | 900–1500 | Timesheet due, end of shift. | |
| 16 May | Fri | B+I | HOM | 1300–2100 | | |
| 17 May | Sat | B+I | HOM | 1300–2100 | | |
| 18 May | Sun | B+I | HOM | 1300–2100 | | |
| 19 May | Mon | Off | | | | |
| 20 May | Tue | Off | | | | |
| 21 May | Wed | B+I | DC | 1100–1700 | | |
| 22 May | Thu | B+I | DC | 1200–1800 | | |
| 23 May | Fri | B+I | HOM | 1300–2100 | | |
| 24 May | Sat | B+I | HOM | 1300–2100 | | |
| 25 May | Sun | B+I | HOM | 1300–2100 | | |
| 26 May | Mon | Off | | | | |
| 27 May | Tue | Off | | | | PAYROLL |
| 28 May | Wed | B+I | DC | 1600–2200 | | |
| 29 May | Thu | B+I | DC | 900–1500 | | |
| 30 May | Fri | B+I | HOM | 1300–2100 | | |
| 31 May | Sat | B+I | HOM | 1300–2100 | Timesheet due, end of shift. | |
| 1 Jun | Sun | B+I | HOM | 1300–2100 | | |
| 2 Jun | Mon | Off | | | | |
| 3 Jun | Tue | Off | | | | |
| 4 Jun | Wed | B+I | DC | 1000–1600 | | |
| 5 Jun | Thu | B+I | DC | 1100–1700 | | |
| 6 Jun | Fri | B+I | HOM | 1300–2100 | | |
| 7 Jun | Sat | B+I | HOM | 1300–2100 | | |
| 8 Jun | Sun | B+I | HOM | 1300–2100 | | |
| 9 Jun | Mon | Off | | | | |
| 10 Jun | Tue | Off | | | | |
| 11 Jun | Wed | B+I | DC | 1600–2200 | | PAYROLL |
| 12 Jun | Thu | B+I | DC | 1600–2200 | | |
| 13 Jun | Fri | B+I | HOM | 1300–2100 | | |
| 14 Jun | Sat | B+I | HOM | 1300–2100 | | |
| 15 Jun | Sun | B+I | HOM | 1300–2100 | Timesheet due, end of shift. | |

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| Date | Day | Duty | Location | Shift | Paperwork due | Comments |
|---|---|---|---|---|---|---|
| 16 Jun | Mon | Off | | | | |
| 17 Jun | Tue | Off | | | | |
| 18 Jun | Wed | B+I | DC | 1000–1600 | | |
| 19 Jun | Thu | B+I | DC | 1100–1700 | | |
| 20 Jun | Fri | B+I | HOM | 1300–2100 | | |
| 21 Jun | Sat | B+I | HOM | 1300–2100 | | |
| 22 Jun | Sun | B+I | HOM | 1300–2100 | | |
| 23 Jun | Mon | Off | | | | |
| 24 Jun | Tue | Off | | | | |
| 25 Jun | Wed | B+I | DC | 1600–2200 | | PAYROLL |
| 26 Jun | Thu | B+I | DC | 1600–2200 | | |
| 27 Jun | Fri | B+I | HOM | 1300–2100 | | |
| 28 Jun | Sat | B+I | HOM | 1300–2100 | | |
| 29 Jun | Sun | B+I | HOM | 1300–2100 | Timesheet due, end of shift. | |
| 30 Jun | Mon | Off | | | | |
| 1 Jul | Tue | Off | | | | |
| 2 Jul | Wed | B+I | DC | 900–1500 | | |
| 3 Jul | Thu | B+I | DC | 900–1500 | | |
| 4 Jul | Fri | B+I | HOM | 1300–2100 | | Holiday worked |
| 5 Jul | Sat | B+I | HOM | 1300–2100 | | |
| 6 Jul | Sun | B+I | HOM | 1300–2100 | | |
| 7 Jul | Mon | Off | | | | |
| 8 Jul | Tue | Off | | | | |
| 9 Jul | Wed | B+I | DC | 1600–2200 | | |
| 10 Jul | Thu | B+I | DC | 1600–2200 | | |
| 11 Jul | Fri | B+I | HOM | 1300–2100 | | PAYROLL |
| 12 Jul | Sat | B+I | HOM | 1300–2100 | | |
| 13 Jul | Sun | B+I | HOM | 1300–2100 | Timesheet due, end of shift. | |
| 14 Jul | Mon | Off | | | | |
| 15 Jul | Tue | Off | | | | |
| 16 Jul | Wed | B+I | DC | 900–1500 | | |
| 17 Jul | Thu | B+I | DC | 900–1500 | | |
| 18 Jul | Fri | B+I | HOM | 1300–2100 | | |
| 19 Jul | Sat | B+I | HOM | 1300–2100 | | |
| 20 Jul | Sun | B+I | HOM | 1300–2100 | | |
| 21 Jul | Mon | Off | | | | |
| 22 Jul | Tue | Off | | | | |
| 23 Jul | Wed | B+I | DC | 1600–2200 | | |
| 24 Jul | Thu | B+I | DC | 1600–2200 | | |
| 25 Jul | Fri | B+I | HOM | 1300–2100 | | PAYROLL |
| 26 Jul | Sat | B+I | HOM | 1300–2100 | | |
| 27 Jul | Sun | B+I | HOM | 1300–2100 | | |

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Appendix A4.–Page 3 of 3.

| Date | Day | Duty | Location | Shift | Paperwork due | Comments |
|---|---|---|---|---|---|---|
| 28 Jul | Mon | Off | | | | |
| 29 Jul | Tue | Off | | | | |
| 30 Jul | Wed | B+I | DC | 900–1500 | | |
| 31 Jul | Thu | B+I | DC | 900–1500 | Timesheet due, end of shift. | |
| 1 Aug | Fri | B+I | HOM | 1300–2100 | | |
| 2 Aug | Sat | B+I | HOM | 1300–2100 | | |
| 3 Aug | Sun | B+I | HOM | 1300–2100 | | |
| 4 Aug | Mon | Off | | | | |
| 5 Aug | Tue | Off | | | | |
| 6 Aug | Wed | B+I | DC | 1500–2100 | | |
| 7 Aug | Thu | B+I | DC | 1600–2200 | | |
| 8 Aug | Fri | B+I | HOM | 1300–2100 | | |
| 9 Aug | Sat | B+I | HOM | 1300–2100 | | |
| 10 Aug | Sun | B+I | HOM | 1300–2100 | | |
| 11 Aug | Mon | Off | | | | |
| 12 Aug | Tue | Off | | | | |
| 13 Aug | Wed | B+I | DC | 1400–2000 | | PAYROLL |
| 14 Aug | Thu | B+I | DC | 900–1500 | | |
| 15 Aug | Fri | B+I | HOM | 1300–2100 | Timesheet due, end of shift. | |
| 16 Aug | Sat | B+I | HOM | 1300–2100 | | |
| 17 Aug | Sun | B+I | HOM | 1300–2100 | | |
| 18 Aug | Mon | Off | | | | |
| 19 Aug | Tue | Off | | | | |
| 20 Aug | Wed | B+I | DC | 1500–2100 | | |
| 21 Aug | Thu | B+I | DC | 1500–2100 | | |
| 22 Aug | Fri | B+I | HOM | 1300–2100 | | |
| 23 Aug | Sat | B+I | HOM | 1300–2100 | | |
| 24 Aug | Sun | B+I | HOM | 1300–2100 | | |
| 25 Aug | Mon | B+I | DC | 1500–2100 | | |
| 26 Aug | Tue | B+I | DC | 1300–1900 | | |
| 27 Aug | Wed | B+I | HOM | 1300–2100 | | PAYROLL |
| 28 Aug | Thu | B+I | HOM | 1300–2100 | | |
| 29 Aug | Fri | B+I | HOM | 1300–2100 | Timesheet due, end of shift. | |
| 30 Aug | Sat | Off | | | | |
| 31 Aug | Sun | Off | | | | |

*Note:* duty code B+I indicates concurrent biological and interview sampling. Horizontal lines delineate workweeks.